Strategic Applications of Controller-Assigned Airborne Separation (CAAS)

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Delegation as part of CAASD Future Vision exploration

CAASD Future Vision explores…

Paradigms and approaches that allow the NAS to scale as a system as demand increases, by scaling provision of service.

One such paradigm is **Delegation:**

Today, most operational problems are currently addressed in a manner centralized within the ATC service provider's role. In the future, delegated responsibility for execution of many problem resolutions will rest with the flight crew, when operationally better positioned to carry them out.

This presentation looks at concepts for applying delegation to operations as the NAS evolves.

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Background

- **Controller-Assigned Airborne Separation (CAAS) is a procedure that expands the concept of visual separation using Automatic Dependent Surveillance - Broadcast (ADS-B) and Cockpit Display of Traffic Information (CDTI)**

  - Separation delegated to cockpit for specific operations at all altitudes and all visibility conditions

  - Use of visual separation expanded to en route in the mid 1990s below FL180

- **Short-term benefits of CAAS are reduced controller workload; long-term benefits are increased sector capacity and throughput as aircraft fly side-by-side instead of in trail**

FAA/Eurocontrol Cooperative R&D

- **CAAS is consistent with the 'Principles of Operation' of the Airborne Separation Assistance Systems (ASAS), which defines four primary categories:**
  - **Traffic situational awareness**
    - Increased pilot awareness of surrounding traffic, including surface
  - **Airborne spacing**
    - In-trail and merging situations, in time or space
  - **Airborne separation**
    - Controller can delegate separation relative to designated aircraft to the flight crew through a new clearance
  - **Airborne self-separation**
    - The flight crew provides separation from all known aircraft in accordance with applicable airborne separation minima

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CAAS Review at CAASD

- **Three potential applications for CAAS:**

  1. **Crossing (pairwise) – tactical and strategic**
  2. **Merging and Grouping**
  3. **Streaming using self-separation corridors**

- **2004 review was for tactical pairwise only, in which controllers used CAAS with current procedures**

- **2005 review will extend to strategic pairwise, which includes automation that provides conflict detection and resolution 20 minutes in advance**

Strategic Pairwise

- **Provides automation support such that conflicts are resolved prior to handoff**
  - **Conflicts detected 20 minutes in advance**
  - **Resolution options include airborne separation, which will be selected for this evaluation**
  - **Flight crew of the 'instructed aircraft' will be notified of the target aircraft, and when to begin the maneuver**
  - **Upon WILCO the flight plan is amended**
- **Objective is to reduce controller workload even further than with tactical pairwise, and set the stage for merging and grouping**

ACTION VIEW

PROBLEMS & RESOLUTIONS | UPLINK | VOICE | SEND AM | CONTACT...

S	F	TIME	FLIGHT ID	PROBLEM	RESOLUTION	POC	STAT
1		6	UAL270	AC - BTA3967	at APE301023 L25° APE356019 R40°		W
1		17	UAL699	AC - SWA327	at APE111035 L40° APE158029 R45°		

PROBLEMS AND RESOLUTIONS VIEW

REVISE RESOLUTION | MANUAL TRIAL PLAN | EXPIRATION TIME (SECS): 24

BTA3967
290 ↑155
R480 TYS

USA155 ◤
260 ↑230
Ø80 448

Ø122
280

1
UAL270 ◤
290 C
720 IAD

UAL615 ◤
310 C
160 476

AAL169 ◤
310 C
Ø60 445

ACTION VIEW

| PROBLEMS & RESOLUTIONS | UPLINK | VOICE | SEND AM | CONTACT... |

S	F	TIME	FLIGHT ID	PROBLEM	RESOLUTION	POC	STAT
1		6	UAL270◣	AC - BTA3967	at APE301023 L25° APE356019 R40° ◢		W
1		17	UAL699	AC - SWA327	at APE111035 L40° APE158029 R45° ◢		

PROBLEMS AND RESOLUTIONS VIEW

| REVISE RESOLUTION | MANUAL TRIAL PLAN | EXPIRATION TIME (SECS): 24 |

UAL270 290 401728/835528..TRAKK.J152.APE300025..APE301023..APE356019..BLISS.J152.JST..AML.

◇ at APE301023 L25° APE356019 R40° ↓ J152(BLISS) (URET HRR)

◇ at APE301023 L30° APE351020 R45° ↓ J152(BLISS)

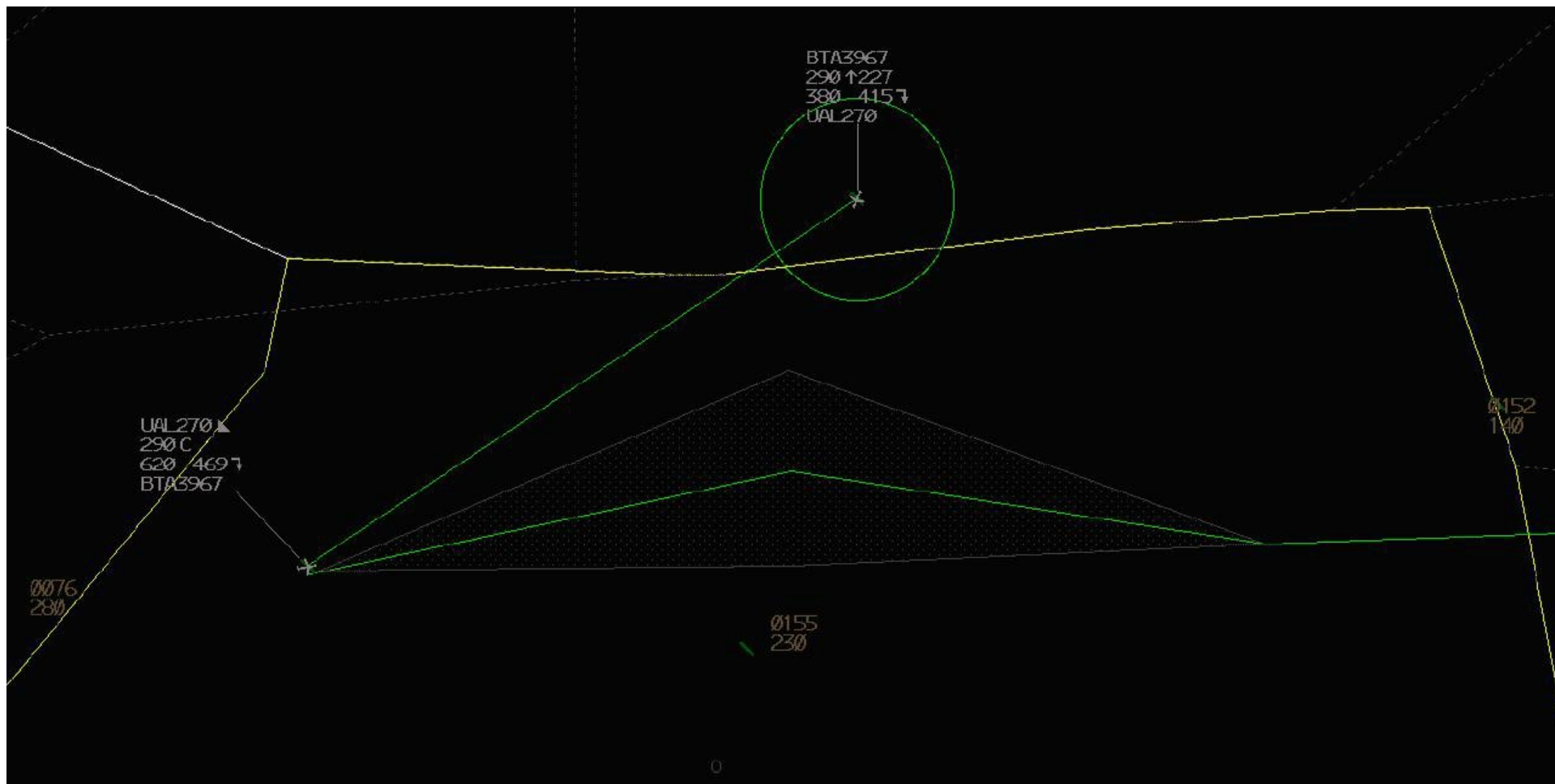◇ at APE301023 R65° APE177035 L80° ↓ J152(AVERE)
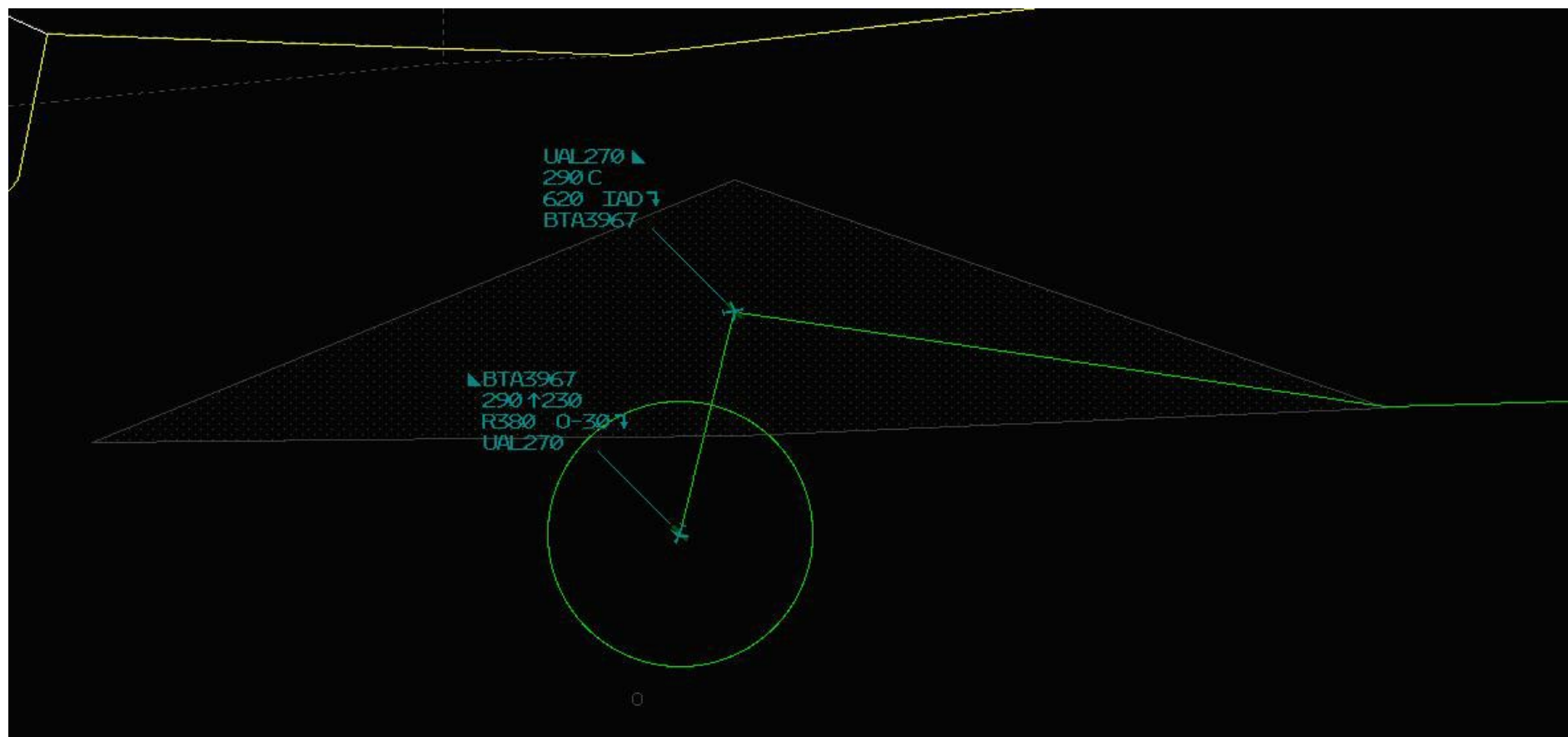
◇ ↓230

BTA3967
290 ↑159
R480 376

1
USA155◣
260 ↑230
080 PHX

0122
280

1   W
UAL270◣
290 C
720 469↓
BTA3967

UAL615◣
310 C
160 ORD

AAL169◣
310 C
060 ILN

UAL270 ◣
290 C
620 IAD ⬏
BTA3967

◤BTA3967
 290 ↑230
 R380 O-30↗
 UAL270

O

Merging and Grouping, and Streaming

- Merging begins upstream of the corridor
- RNP offsets used to establish separation
- CDTI to ensure separation from adjacent aircraft

Next Steps

- **Continue to develop more robust experiments for ASAS applications that include separation delegation to flight crews**

- **Integrated pilot-controller experiments**
  - **Pilots able to assume control over any aircraft in the simulation**
  - **If able, multiple cockpit simulators used to populate the airborne situation**

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